

# SOT



**Cleaning Firearms Lab**

**S O N O R A N**



**D E S E R T  
I N S T I T U T E**

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# **SONORAN DESERT INSTITUTE**

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## **SCHOOL OF FIREARMS TECHNOLOGY**

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## Introduction

Cleaning a firearm is the most important step in ensuring good functionality, reliability, and accuracy. A properly maintained firearm is less likely to malfunction, and cleaning keeps rust and other corrosion from prolonged damage. A firearm is a major investment, and with proper care can last many lifetimes. Also to be considered while cleaning is the external appearance of the firearm; it is just as important as the internal condition and should not be neglected.

Many gun owners rarely, if ever, clean their guns, because they do not know how, do not have the proper equipment, or do not want to take the time. In servicing firearms, you may find that operating difficulties are more frequently caused by dirt than by mechanical

malfunction. A simple cleaning often returns the firearm to working condition. Your primary concern when handling any gun is safety at all times. Many accidents that occur during gun cleaning could be prevented with some common sense and attention to the rules of safe firearms handling. If necessary, review the safety procedures discussed in your first lesson.

There are many opinions on when a firearm should be cleaned. Ideally, the firearm should be cleaned after every shooting session. If you cannot clean the gun on the same day it is used, clean it as soon as possible. The longer the powder residue sits, the harder it is to remove. Also, some ammunition on the market is made with corrosive primers that have an acid base that can degrade the bore and chamber very quickly. For people who own black powder firearms, cleaning after each firing session is absolutely necessary, since black powder is also corrosive in nature.

**The first step in cleaning a firearm is the most important: Make absolutely sure that the gun is safe at all times! To clear a weapon, point in a safe direction, open the action of the firearm, visually and manually check the chamber.**



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# Contents

The materials you should have received in this lesson are shown below in Figure 1. You may receive a different set of tools, but the general use of them will not change. If any of the parts are missing, contact Student Services. The missing part will be sent to you. If you find that any of the parts are damaged, return the part to SDI for replacement. The materials included in this training unit allow you to clean all rifles and handguns from .17 to .50 caliber and shotguns up to 12-gauge. In addition to the training unit equipment, you will need an old toothbrush or some other type of soft nylon brush.



Figure 1: Lab kit

*\* Please note that from time to time tools for the lab lessons may be unavailable. Should this occur, we will substitute an appropriate kit that will meet the objective of this lesson. Based on market availability, the exact manufacturers of these pieces vary from time to time. We strive to provide quality tools to our students to use as they gain the knowledge of the gunsmithing industry. Our students realize that they will be responsible for purchasing additional tools for their businesses.*

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## Preparation

You will need a quiet, secluded, and spacious place to work while you clean firearms. The ideal place to work is at a bench in a workshop. However, any table will do if you take a few precautions. Cover the table with a thick towel or other protective material to protect both the table and the gunstock.

The first step in cleaning a firearm is the most important: **Make absolutely sure that the gun is safe at all times!** To clear a weapon, point in a safe direction, open the action of the firearm, visually and manually check the chamber. If there is a detachable magazine, remove it from the firearm. If not, make certain there are no cartridges left in the magazine. It is recommended to use a bore light (not included in the kit), to check the bore to be sure there are no obstructions. Take a moment to check the overall condition of the bore. If you are working on a customer's firearm and you find a pitted, rusted, or fouled bore, advise the customer of the situation before you do any more work. It shows the customer that you intend to do a thorough job and prevents them from returning and claiming that your work damaged the bore.



*Figure 2: The floor plate of a rifle. Familiarize yourself with proper terminology of firearms.*

While you are disassembling a firearm for cleaning, check the parts for wear or damage. If it is a customer's gun and a problem is found, stop and inform the customer of the problem and give the approximate cost of repair. For a general cleaning, field strip the weapon per the manufacturer's instruction. If detail stripping for deep cleaning, refer to schematics, exploded views, and/or the owner's manual for specific disassembly instructions. Disassemble the firearm only as much as necessary to do a good cleaning job.

Bear in mind different firearm surfaces react differently to different chemical compounds. The modern firearm contains but is not limited to the following materials; metals, plastics, rubber grommets, paint, hydro dipping, glass, batteries, and lasers. It is important to be cognizant of these materials as not to destroy workmanship, customizing, or parts of a customer's firearm. Some firearms can present themselves with less than simple tear down and assembly procedures. Utilizing a camera to document the location of screws, springs, and various other parts can benefit the gunsmith as well as assist with reassembly. Furthermore, documenting the exact location of optics and accessories on a customer's firearm can ensure the firearm has been properly reassembled.



*Figure 3: A Sig Sauer SP2022. This pistol uses a 1911-style slide release lever, unlike the P-Series, which uses a takedown lever. It's always important to research each weapon that you disassemble.*



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## Cleaning a Bolt-Action Rifle

Enthusiasts who are into precision long-range hunting, bench rest competitions, and military snipers may all have different opinions on how to best care for bolt-action rifles. In this lesson we'll explore some of the tools and chemicals that may or may not be included in your kit, as well as common techniques on the care of these rifles. Though the brand and type of bolt-action may differ to some extent, the cleaning process for each of these rifles is similar in nature. In our example, we will use the Ruger American Rifle®. Point the firearm in a safe direction to begin cleaning procedures below.

**Step 1 – The first step is to make the weapon safe.** To do this, charge the bolt to the rear, extract any live rounds, and place the weapon on safe (if a safety latch exists).

**Step 2 – Remove either the floor plate, magazine, internal box, or other method of removing rounds from the rifle** (Figure 4).



*Figure 4: Removing magazine from rifle.*

**Step 3 – Remove the bolt,** keeping in mind that some models make bolt removal difficult, so always consult the owner's manual or other diagrams on the proper removal technique (Figure 5).

**Step 4 – Next, it's imperative to both visually and manually inspect the chamber** for obstructions or stuck cartridges. If



*Figure 5: Remove the bolt.*

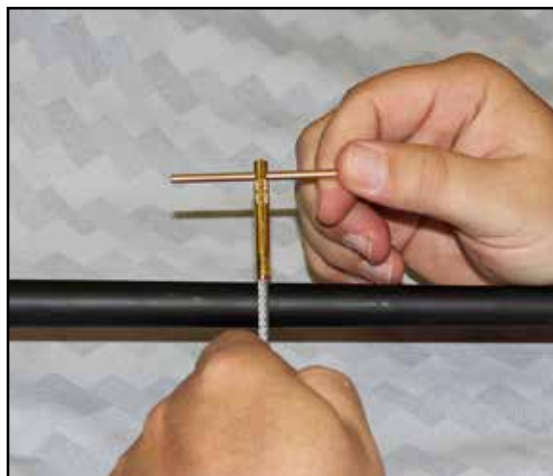
the chamber and bore are clear, then it's a good idea to use a bore light to inspect and determine if the bore is pitted or if other fouling exists.

**Step 5 – Clean the bore.** Point the firearm in a safe direction to begin cleaning procedures below.

1. Assemble the Otis® patch for use with the pull cable. The slits in the patch are designed for separate calibers. For smaller calibers, fit the slotted tip on the outer slit of the patch — for larger calibers, use the slit closest to the center of the patch (Figure 6).
  - Another recommended bore cleaning tool is the nylon single-piece rods. Popular brands are Dewey®, Tipton®, and Bore-Tech® rods. Use these in conjunction with a bore guide specific to the caliber.
  - Refrain from using cheap detachable 2- or 3- piece brass or aluminum rods. The actual brass and aluminum material can be imbedded into the bore over time, and the threads of these types of rods can scratch the rifling.
2. Apply a light coat of Carbon Destroyer to a patch, but do not oversaturate the patch. Solvents may also be used for this purpose, such as Break Free®, M-Pro 7® Gun Cleaner, and Hoppe's® #9.
  - **Important:** Some solvents can be damaging to other parts of the firearm, so protect your optics and wood stocks (the same is true for film-dipped polymer stocks). If accidentally spilled in these areas, take care to wipe away any sign of chemical residue as soon as possible. For antique firearms, using these solvents can quickly damage the patina and finish. It may be
3. Run the nylon-coated end of the pull cable through the bore and attach the pull handle. Pull the cord, ensuring that the cable runs center through the bore. The cord may twist along the grooves of the rifling, which is the desired effect (Figure 7).
  - **Important:** Some solvents can be damaging to other parts of the firearm, so protect your optics and wood stocks (the same is true for film-dipped polymer stocks). If accidentally spilled in these areas, take care to wipe away any sign of chemical residue as soon as possible. For antique firearms, using these solvents can quickly damage the patina and finish. It may be



*Figure 6: Put the patch on the pull cable.*



*Figure 7: Attaching pull handle to cable.*



*Figure 8: Running cleaning brush through barrel.*

necessary to remove the receiver from the stock in order to protect against possible permanent damage.

4. Attach a copper brush to the pull cable and repeat item 3. Do not apply oil or solvent to the brush as it can easily spill into the chamber. Some disagree on copper brushes and only use polymer brushes, but many shooters agree to only run the brush once from breech to muzzle, and not back and forth through the bore.
5. Repeat items 1, 2, and 3.
6. Check for copper or lead fouling inside the bore. Copper cleaning chemicals such as the MSS Copper/Lead Destroyer, Bore Tech Eliminator™, and Otis Copper Remover are recommended. Run a patch with a chosen cleaner through the bore.  
**Remember:** Only do this step if fouling exists — excessive use of some brands of copper cleaners can wear down the bore (Figures 9 and 10).
7. Repeat items 1, 2, and 3, followed by a dry patch through the bore. Continue to run a dry patch through the bore until it is free from solvent, dirt, and carbon.
8. The last item is to run a patch with a light amount of the Spartan Accuracy Oil (SAO) you've been given through the bore. Other oils that may be used include Frog Lube®, Slip2000™,



*Figures 9 and 10: Copper solvents.*



Ballistol®, RemOil™, and others. Figure 11 shows technique; Figure 12 shows a picture of Ballistol.

**Step 6 – Clean the bolt.** For general cleaning, follow these steps:

1. Use a nylon brush along with the Carbon Destroyer or solvent and scrub the bolt face, locking lugs, cocking cam, and sear engagement. Let stand for 2 minutes (Figures 13 and 14).
2. Dry the entire bolt completely, leaving no solvent remaining.
3. Apply a very small amount of gun grease such as Tetra Gun Grease™ or MSS Spartan Accuracy Grease™ to the areas mentioned in item 1.
4. Apply a thin coat of SAO or other lubricant to the outside of the sleeve of the bolt body.

If customers complain about their bolt-action rifle misfiring or failing to fire, it's most likely caused by gummy buildup in the internals of the bolt mechanism, and detailed cleaning may be required. The advanced cleaning of the bolt is as follows:

5. Disassemble the bolt sleeve from the striker assembly per the manufacturer's instructions. See the example of a Mauser disassembled bolt in Figure 15.
  6. Once the two pieces are disassembled, place them onto a paper towel. Spray thoroughly with gun degreaser, such as TCE Cleaner/Degreaser or Rem® Action Cleaner.
  7. Let the degreasing liquid dry and place them onto a clean paper towel.
  8. Apply a thin coat of gun grease on the side of the striker assembly springs, coat with your fingers or a dry rag, and reassemble.
- **Warning:** If the rifle is going to be used in excessive temperatures, ensure that the grease you use is rated for all environments.



*Figures 11: Running accuracy oil through the bore.*



*Figure 12: Ballistol cleaning and lubricating spray.*



*Figure 13: Use a brush to clean the bolt face.*



*Figure 14: Use a brush to clean the sear engagement.*



*Figure 15: Mauser disassembled bolt.*

#### **Step 7 – Clean the receiver.**

1. Scrub the receiver area with Carbon Destroyer and let stand for 2-3 minutes. Wipe the receiver area dry with a clean rag or compressed air.
2. To clean the lug recess area, it is recommended to use a Sinclair® or Tipton chamber cleaning tool kit. The instructions on using these kits are as follows:
  - Apply solvent to the cotton swab that comes with the recess tool, and run the tool down the raceway and into the locking lug recess.
  - Clean thoroughly by twisting the rod back and forth inside the recess.
  - Repeat the process, and run dry swabs until all carbon and dirt is removed. This is usually the dirtiest part of cleaning a bolt-action firearm.



*Figure 16: Cleaning the receiver.*

3. If you don't have access to the chamber cleaning tool kit, a GI brush and solvent may be the trick. Ensure that the chamber is completely dry after cleaning (Figure 16).
4. Apply a thin coat of oil inside of the receiver using your fingers or a dry rag.

#### **Step 8 – Clean the chamber.**

1. Using a dry mop brush, completely clean the chamber, leaving absolutely no residue, solvent, or oil behind. Whereas the locking lugs and recess can be slightly lubricated, the chamber must always remain dry.

**Step 9 – Clean the trigger mechanism.** The trigger mechanism should only be cleaned if the rifle has a gummy trigger or shows signs of excessive dirt and oil. Care should be taken while doing this procedure, as follows:

1. Use a degreasing compound such as Rem Action Cleaner or non-chlorinated brake cleaner to spray the mechanism, and place it on a clean surface.
2. Dry the mechanism using air compression and wipe the exterior clean; no disassembly of the trigger mechanism is necessary.
3. On certain models such as the Remington® 700, the manufacturer recommends oiling only the sear engagement screw, overtravel screw, and the trigger pull screw. Always follow these directions, as excessive oil in the mechanism can lead to a malfunctioning rifle (Figure 17).



*Figure 17: Some manufacturers recommend oiling only the sear engagement screw, overtravel screw, and the trigger pull screw.*



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## Cleaning Shotguns

The process of cleaning a shotgun is very similar to cleaning rifles, but there is some variation. Most pump-action shotguns, as well as a large percentage of semi-automatics, have removable barrels. Usually, the barrel can be removed by unscrewing the large thumb-nut at the end of the magazine tube. Older models of shotguns may not allow for easy barrel removal, and the Otis flex rods and/or Hoppe's Bore Snake is better used to clean the barrel in an expeditious manner. We'll discuss the different types of shotguns, and how they can be cleaned properly.

### CLEANING AN AUTOLOADING SHOTGUN

Semi-automatic (or autoloading) shotgun cleaning can be a complicated process. Many of these types of firearms are gas-operated and special care must be observed while cleaning



*Figure 18: Make weapon safe.*

the removable bolt and gas system components during removal and reassembly. Other shotguns, such as the venerable Browning® A5 autoloader (pictured above,) have a spring mechanism that requires a separate disassembly procedure, along with specialized tools. In our example, we will be cleaning the Remington Model 11-87 20-gauge shotgun.





## Product Highlight: Modern Spartan Systems® Spartan Carbon Destroyer™ and Spartan Accuracy Oil™

A feature of these products is not only to clean, but also improve accuracy. Through these MSS products, you are now able to condition your bore by improving its smoothness and strength. The steps below will teach you how to achieve this result:

1. Remove carbon fouling by cleaning the bore Spartan Carbon Destroyer.
2. Remove copper and/or lead fouling. If copper and/or lead are present, follow the instructions and thoroughly remove the contaminants with Spartan Copper/ Lead Destroyer.
3. Condition with Spartan Accuracy Oil. To achieve friction reduction, protect the metals from oxidation and corrosion to minimize the build-up of future contaminants inside the barrel.
  - Apply Spartan Accuracy Oil by running a lightly coated bore patch, cotton swabs or a clean cloth on all metal parts where there would be metal to metal contact.
    - » You do not need much product, just enough to coat everything thoroughly, but lightly.
    - » Allow 3-5 minutes for the product to penetrate, and wipe off any drips if they exist.
4. Load and fire 5 rounds (to really heat up the barrel, shoot 10 rounds). Since heat helps to fully active the molecules in the formula, firing rounds through the barrel is the key to creating a harder, smoother bore surface.
5. Let the barrel cool for a few minutes (a warm barrel is fine for this process) and apply another coating of Spartan Accuracy Oil onto all metal parts, including inside the bore. (Before firing subsequent sets of rounds, some people like to clean possible fouling. This practice of cleaning in-between shot groups with Carbon Destroyer is fine to do and up to the individual).
6. Repeat steps 4 & 5 five (5) times.
7. **Continued maintenance:** Once you have “broken in” your firearm, stay on a regular cleaning and lubricating schedule as needed. Some individuals have noticed that bullet velocity has continued to increase with continued use. You will notice that both future cleaning and lubricating are significantly easier and faster and that time periods between cleaning and lubricating are much longer. For a video on this process, please visit [www.modernspartansystems.com](http://www.modernspartansystems.com).

### Step 1 – Clean the bore.

1. Make the weapon safe by charging the bolt and locking it to the rear (Figure 18). Remove all shells from the shotgun. Visually and manually inspect for any obstructions in the barrel, as dirt and spent wads can get stuck down the barrel.
2. Keep the bolt locked to the rear. Remove the barrel nut, the forend, and the barrel. Make sure to look out for any small pieces falling from the magazine tube, as there may be an O-ring and metal gas rings that may come loose during disassembly (Figures 19 – 21).
3. Using the Otis® kit, take the tip and place a lightly soaked patch through the centermost slit. Use Carbon Destroyer or a solvent to soak the patch.
  - Note: Brownells® has a great solvent specifically made for plastic fouling — Shotgun Wad Solvent™. Cleaning plastic is unique to shotguns, as the wad residue must be cleaned, as well as residue in the forcing cone and chamber. This can be applied to a patch and run through the bore as this step has outlined.



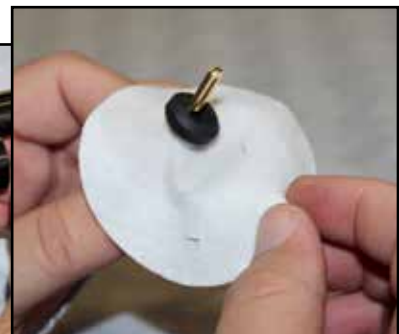
*Figure 19: Remove the barrel nut.*



*Figure 20: Remove the forend.*



*Figure 21: Remove the barrel.*



*Figure 22: Place the rubber patch saver disk atop the patch.*

4. Place the rubber patch saver disk atop the patch. The patch saver accessory increases the diameter of the cleaning area in order to clean the chamber, forcing cone, and bore (Figure 22).
5. Pinch the tip of the patch and pull through the tip; flare up the bottom of the patch around the patch saver (Figure 23).
6. Attach the obstruction removal tip to the other end of the cable and place it down the bore from breech to muzzle.
7. Feed the small pull rod through the hole in the obstruction removal tool. Pull the patch through from breech to muzzle — this may require standing the shotgun on end or placing it in a vise to gain leverage (Figure 24).
8. Detach the patch/patch saver disk assembly from the end of the rod and attach the bore brush associated with the correct gauge of the shotgun.
9. Run the brush through the bore as outlined in item 5 (Figure 25).
10. If lead or fouling exists in the forcing cone or at the choke, use a brush in conjunction with a lead remover. If need be, remove the choke and inspect for fouling (Figure 26).



*Figure 23: Pull patch through tip.*



*Figure 24: Pull patch through from breech to muzzle.*



*Figure 25: Run brush through the bore.*





*Figure 26: Remove and inspect the choke if necessary.*



*Figure 27: Remove the bolt.*

11. Repeat items 1 – 5 above.
12. Use a clean patch and repeat items 1 – 5 above until the bore is completely dry. Use a patch lightly soaked in MSS Spartan Accuracy Oil and repeat items 1–5 above.
13. Ensure that the chamber area remains dry.

**Step 2 – Clean the bolt.** On autoloading shotguns, the bolt may be difficult to reach, so make sure to follow the manufacturer's instructions and or quality diagrams. On most autoloading shotguns, the procedure is as follows:

1. **Place the weapon on safe**, release the bolt lock and guide the bolt back to the forward —do not slam the bolt forward (Figure 27).
2. Remove the charging handle from the bolt (Figure 28).
3. Remove the bolt (Figure 29).
4. (Optional): For deep cleaning of the receiver and trigger assembly, you can remove the trigger assembly by using a brass hammer and punch set to remove the two retaining



*Figure 28: Remove the charging handle.*



*Figure 29: Remove the bolt.*

pins. From there, carefully remove the assembly. Do NOT heavily oil the trigger assembly (Figures 30 and 31).

5. When cleaning the bolt, be sure to first use the MSS Carbon Destroyer or solvent. After inspection, dry completely and add a small amount of oil to the bolt (Figure 32).

### Step 3 – Cleaning the gas system on autoloading shotguns.

1. On most gas-operated actions, specifically pressure-compensating gas systems, there are some features that may require regular maintenance. One thing is for sure — keep the gas system dry and clean!
  - Be sure to clean the two gas port holes with a gas port brush or pipe cleaner (Figure 33).
  - Clean the piston seals with a good solvent such as Slip2000™ Choke Tube Cleaner, and keep dry.
  - It's also recommended to purchase a set of barrel seal O-rings since they may wear and snap over time (Figure 34).



*Figure 30: Using a brass hammer and punch to remove the retaining pins.*



*Figure 31: Removing the assembly.*



*Figure 32: Dry the bolt completely.*



*Figure 33: Clean the gas port holes.*





*Figure 34: Barrel seal O-rings.*



*Figure 35: Friction ring.*

2. For gas-piston models, it's recommended to keep the components in a pan of mineral spirits or other types of solvent to soak. Depending on the wear, some owners keep these materials soaking overnight. Dry the components thoroughly before reassembly and use.
  - Note: For recoil-operated auto shotguns such as the Browning A5, the same cleaning procedure can be followed as in item 2 above. These rings are called "friction" rings (Figure 35) rather than gas rings. The Browning A5 owner must change out friction rings depending on how heavy the load of the shell. Gas-operated systems are able to interchange between heavy and light loads with modifying the gas system.

## **CLEANING A BREAK-OPEN ACTION SHOTGUN**

Generally speaking, a higher amount of care must be taken with break-open action shotguns, as these guns may be the oldest and/or the most valuable in an owner's possession.

If you are not familiar with the disassembly procedure of the shotgun, do not attempt it. Specialized manuals and schematics may offer some assistance, but training under a master gunsmith specializing in this field is your best bet.

The cleaning of a break-open shotgun is not terribly difficult, as many shooters focus on the bore, chamber, and choke areas for general cleaning. Detailed cleaning of the firing mechanism may not always be necessary, as it is separated in large part by the breechblock and does not accumulate a lot of carbon or dirt. Also, a general rule for any shotgun with a wooden stock (especially those with ornate engraving) is to never apply solvent, oils, or any other chemicals except for furniture polish to a non-metal part of the weapon.

### **Step 1 – General cleaning tips:**

1. To remove most break-open barrels, it's an easy process. There should be a snap lever at the forend that will allow you to remove it.
2. While holding the barrel, press the release lever as if you're loading the shotgun, and the barrel will be removed.
3. Once the barrel is removed, the shotgun is now in its three main pieces.

4. For general bore cleaning, the same procedure as discussed in the autoloading portion remains the same.
5. After each use, be sure to apply new grease, such as Tetra Gun Grease®, to the hinge pin, knuckle, cocking lever pin, and front lug.
6. For wooden parts, treat the stock like any other wooden piece of furniture. Give the wood a good wipe down with a clean cloth, and use carnauba wax or furniture polish for a final shine. **Note:** Applying a heavy amount of petroleum-based gun oil or mineral spirits over time will ruin the finish of the wood.



*Figure 36: Break-open shotgun.*

### Step 2 – Detailed cleaning:

1. It is recommended to take apart the extraction lever from the barrel assembly after field use in inclement weather. Many models require the shooter to use specialized tools, so be aware of your model.
2. Remove the extractor as prescribed and scrub with a solvent and brush. Acetone-based solvents are best used for deep cleaning, and soaking rusted parts is recommended.
3. Some gunsmiths recommend disassembly of the stock once per year to clean the trigger assembly and internal parts. Removing this area requires special knowledge and tools. During this process, stripping old gun grease with solvent, drying, and reapplying new grease is recommended.



*Figure 37: This is a Russian MTS-7 exclusive model worth around \$10,000.*



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# Cleaning Handguns

Unlike rifles and shotguns, handguns usually receive the most amount of abuse during a shooting session. Rifle shooters tend to shoot no more than 20–30 rounds per session, whereas a handgun shooter is just getting warmed up at 50–100 rounds. Some suggest disassembling a pistol, placing it in a bath of solvent and then heavily oiling the pistol, but this is not recommended. Heavy amounts of solvent can dissolve gun grease, which may be present in the main-spring housing area, and heavy amounts of oil always attract unnecessary amounts of dirt.

## CLEANING A REVOLVER

The most important thing to remember when cleaning a revolver is making sure you use a

lead-removing solvent to deep clean the forcing cone, barrel, and chambers, since a lot of revolver ammunition can be either semi-jacketed or not jacketed at all. Using solvents such as Hoppes #9 or Ballistol is effective for removing powder residue from these areas, but if flaky, dark residue is leftover, then lead remover is your next option. In our example, we will clean the Ruger LCR .357 hammerless revolver.

### Step 1 – Clean the cylinder.

1. First, open the cylinder (Figure 39). Scrub the face of the cylinder with a solvent.
2. The notches on the cylinder are called “cylinder stops,” and they must be cleaned as well. Scrubbing this area with a bristle brush may not be enough, so be prepared to use a brass scrubbing tool or the end of a wooden match to get the powder residue out.



*Figure 38: Handguns usually require more frequent and thorough cleanings.*



*Figure 39: Open and inspect the cylinder.*



*Figure 40: Cleaning the forcing cone.*

### **Step 2 – Clean the forcing cone and barrel.**

1. We will start by cleaning the forcing cone area with MSS Carbon Destroyer or a good solvent. These areas receive the most amount of carbon and powder residue (Figure 40). This area, along with the chamber receive a large amount of lead deposits.
2. Scrub the barrel with solvent and place the Otis® patch from breech to muzzle and dry thoroughly. For pistols, placing oil down the barrel is not necessary.

### **Step 3 – Clean the individual chambers.**

1. Next, we'll move on to cleaning the chamber. With the cylinder open, use a brush with solvent to clean inside each chamber. Depress the ejector rod, and be sure to scrub the rod and ratchet (Figure 41). Completely dry these areas with a clean rag or caliber specific mop.
2. Use either a brass brush or a jag with a brass screen to remove lead. A good product is the Lewis Lead Remover™ Pistol and Revolver kit, which uses brass patches and a rubber arbor to clean out the lead deposits imbedded in both the chamber and the bore. This product, along with JB® Bore Compound will work best. Remember to finish by cleaning with solvent and completely drying these areas.



*Figure 41: Cleaning the rod and ratchet.*

#### Step 4 – Clean the recoil plate.

1. The next area we'll focus on is the recoil plate where the firing pin contacts the primer of the round. First, clean the powder residue from the plate with a dry rag, and then scrub with solvent to remove any carbon. Remember that a heat mark will indelibly be left on the plate near the firing pin area after heavy use (Figure 42).

#### Step 5 – Detailed cleaning:

1. For detailed cleaning of a revolver, it's important to remove the crane by unscrewing the crane screw. Each revolver model has a different way of removing the crane, so be sure to research the model you're working on. Clean the crane with solvent, and apply a small amount of oil to it. Also add a small amount of oil to the ejector rod and spring area.
2. Remove the grip and scrub the exposed areas with solvent (Figure 43). Dry these areas completely, and reapply new grease to the mainspring as needed.
3. Open the actual frame by removing screws or with a punch set. The internals of the frame can simply be sprayed with an acetone-based liquid or Gun Scrubber®. Any of the internal areas that have old grease can be reapplied with new gun grease. Reinstall all of the components per the schematic instructions.



*Figure 42: Cleaning the recoil plate.*



*Figure 43: Remove the grip and clean with solvent.*



## CLEANING A POLYMER PISTOL

The modern polymer pistol is one of the most popular styles of handguns on today's market. The takedown and cleaning of the pistols can vary between models, but some features are common in between them. In our example, we will clean the Smith and Wesson® SW40VE pistol (Figure 44). The takedown and cleaning is similar to that of Glock®, S&W® M&P, and Springfield® XD designs.

### Step 1 – Disassembly

1. Disassemble the pistol by first retaining the slide slightly back and holding it to the rear. At the same time, depress the slide lock (Figure 45).
2. Pull the trigger, and the slide along with the barrel assembly will be released (Figure 46).
3. Take the spring and guide rod out by depressing the rod (Figure 47).
4. Remove the barrel assembly. (Figure 48)

### Step 2 – Clean the barrel.



*Figure 44: S&W Sigma 40VE pistol.*



*Figure 45: Hold slide to the rear.*



*Figure 46: Pull trigger and slide along with barrel.*



*Figure 47: Remove spring and guide rod.*



*Figure 48: Remove barrel assembly.*



*Figure 49: Clean feed ramp.*



*Figure 50: Clean the barrel with a brush.*

1. Scrub the barrel with solvent, paying particular attention to the feed ramp (Figures 49 and 50). If excessive copper fouling or carbon is on the feed ramp, you may experience feeding issues.
2. Clean the bore with a bore brush, along with copper solvent and patches. Dry the bore completely, no oil is necessary in the chamber or bore.
3. Oil the barrel lug and outside of the barrel.

**Step 3 – Clean the pistol grip and lower receiver.**

1. Use solvent to scrub the polymer receiver, and dry with an air hose. Do not apply excessive oil to the internal trigger mechanism.
2. There are four slide rail cuts that need to have one drop of oil each (Figure 51).

**Step 4 – Clean the slide.**

1. Remove all carbon and dirt from the slide housing. Once complete, apply a small amount of oil to the slide rails (Figure 51).

**Step 5 – Clean the magazine.**

1. Take apart the magazine sleeve from the magazine spring by depressing the retaining pin using a punch. Scrub the magazine with a solvent, brush, and dry completely (Figure 52).



*Figure 51: Oil the four slide rail cuts.*



*Figure 52: Lubricate the side rails.*

## CLEANING A 1911 PISTOL

The last pistol variant we'll cover is the legendary John Moses Browning design — the 1911 pistol. There are steps in this pistol design that vary greatly from the other semi-auto polymer pistols and revolvers of today. We'll discuss how to properly disassemble and clean this firearm in detail. As an example, we'll use the Springfield 1911 A1 design (Series 70), modified with a two-piece guide rod (Figure 53).

### Step 1 – Remove the slide and barrel.

1. Remove the magazine and pull the slide back and lock it in the open position. Visually and physically inspect the chamber. Remove the magazine.
2. Since the design has a two-piece guide rod, we need to use a  $\frac{5}{32}$  Allen wrench to remove the forward piece (Figure 54).
3. With the slide forward, and facing the muzzle of the pistol, press the recoil spring plug inward until the barrel bushing is free to be twisted clockwise, until it uncovers completely the recoil spring plug. The recoil spring plug is under pressure from the recoil spring, so keep pressure on the plug, and release the spring pressure slowly (Figures 55). Remove the recoil spring plug and the recoil spring (Figure 56). Remove the barrel bushing by twisting it clockwise until it comes off (Figure 57).



*Figure 53: Springfield 1911 A1 pistol.*



*Figure 54: Use Allen wrench to remove forward piece.*



*Figure 55: Keep pressure on plug to release the spring pressure slowly.*



*Figure 56: Remove the recoil spring plug.*



*Figure 57: Remove the barrel bushing by twisting it.*



4. Pull the slide to the rear, until the slide release lever end is aligned with the small circular notch, on the left side of the slide (Figure 58).
5. Push the axis of the slide release lever from the right side of the gun, toward the left side. The slide release lever will pop out. Pull it completely off the frame of the gun (Figure 59).
6. Turn the slide upside down, remove the recoil spring guide, and move the barrel link forward. From here, you can remove the barrel from the slide housing (Figures 60 and 61). Now, the weapon is field stripped.



*Figure 58: Pull the slide to the rear.*

#### **Step 2 – Clean the barrel.**

1. The most important difference between the 1911 barrel and others is the unique locking lug (Figure 62) feature (found also in the Browning Hi-Power). These lugs are important to the short-recoil operation of the pistol, and are found on the top of the barrel. Thoroughly clean with solvent and a brush (Figure 63).
2. As with other weapons, clean the bore with a set of brushes and patches. Keep the barrel and chamber dry. Apply a small amount of lubrication to the locking lug area and barrel.



*Figure 59: Depress slide release lever and pull from assembly.*





*Figure 60: Rotate barrel link to top of barrel.*



*Figure 61: Remove the barrel from the slide housing.*



*Figure 62: Locking lug.*



*Figure 63: Cleaning the lugs.*



*Figure 64: Inspect the lugs for wear.*



*Figure 65: Cleaning the breech face.*



*Figure 66: Cleaning slide rails.*

### **Step 3 – Clean the slide.**

1. The first part we'll clean on the slide is the recess lugs inside the top frame. This is where the locking lugs fit into as discussed in Step 2. Clean thoroughly with solvent and completely dry this area. Always inspect if the lugs or the recess areas are worn (Figure 64).
2. Next, we'll focus on cleaning the breech face, where a lot of erosion can quickly occur. Scrub with solvent and dry completely. Ignore any heat marks that will typically stain this area (Figure 65).
3. Next, clean the slide rails completely with solvent and run a dry patch to completely dry the area. Oil this area lightly (Figure 66).
4. Keep the extractor and extractor channel dry and free of lube.

### **Step 4 – Clean the frame.**

1. Key areas to clean are the magazine well, which should be completely scrubbed with solvent and dried with an air hose or with a clean rag.
2. Clean the rails with solvent and dry. Apply with a small amount of oil (Figure 67).

### **Step 5 – Advanced cleaning.**

1. For advanced cleaning, remove the grips with a slotted screwdriver or Allen wrench. Spray the frame with Birchwood Casey Gun Scrubber® or another aerosol cleaner/degreaser.
2. Every so often, it's important to clean the firing pin area and extractor. Here are the steps on how to complete this process:



*Figure 67: Oil the rails sparingly.*

- Depress the firing pin, and remove the plate.  
A newer design of the 1911 is commonly referred to as the Series 80, in which a firing pin block was added to this area as opposed to the Series 70, which does not include this feature. To remove the plate, depress the safety plunger at the same time that you depress the firing pin. The plate should be easy to remove at this point. Ensure that these small parts are placed into a magnetic dish or on a dry towel.
- Remove the firing pin and extractor from the rear of the slide.
- Depress the extractor on the front of the breech face and the firing pin block should just fall out. For a video on this process, visit this website: <https://www.youtube.com/watch?v=ERg3--kn4BM>.
- Clean these small parts with solvent and completely dry.

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## Cleaning an AR-15

Cleaning the “black rifle” is a dogmatic process, best learned from military professionals and police officers during their training. It’s important to note that unlike most rifles and pistols, AR-style weapons are able to be lubricated more between shooting sessions than other firearms. This is because many shooters tend to go through 150–200 rounds per shooting session, and the rifle must be well lubricated to overcome the high heat and carbon build-up while shooting. Removing the built-up carbon and dirt, coupled with the durability of the platform, it’s no wonder most shooters typically dunk the weapon in a solvent bath or ultrasonic cleaner, scrub, and then lubricate as needed. In our example, we’ll use a variety of the tools you’ve been given to clean the weapon.

*NOTE: Carbon Destroyer can be used very quickly and effectively in an ultrasonic cleaner with portable water, usually at a 10 percent ratio. The tank can be run at ambient temperature of 130°.*



Figure 68: Cleaning an AR-15-style rifle.



Figure 69: Removing the upper receiver from AR-15-style rifle.

Here are the steps:

**Step 1 – Clear the weapon** by pointing the firearm in a safe direction. Remove the magazine if applicable. Pull the charging handle to rear while simultaneously locking the bolt. Observe that the chamber is empty.

**Step 2 – Release the bolt forward.**

**Step 3 – Push in the upper receiver takedown pins;** one is located just behind the delta ring, and the other is located near the buttstock (Figure 69).

**Step 4 – Remove the upper receiver.**

**Step 5 – Pull the charging handle to the rear.** The bolt and the charging handle will come loose.

1. Ensure that the slot of the upper receiver slide rail and the notch on the charging handle are aligned. Remove the charging handle and set aside.

**Step 6 – Disassemble the bolt housing group.**

1. Remove the cotter pin from the side of the bolt housing group (this may take an Allen wrench to remove). Set aside in a designated magnetic dish or paper towel (Figure 70).
2. Drop the firing pin from the rear of the housing, and set aside (Figure 71).
3. Depress the bolt face, and the cam pin should slide back on its railing. Rotate the cam 90° until it is parallel with the bolt rails. Remove the cam by tipping it out onto the table and set aside (Figure 72).
4. Remove the bolt from the front of the housing area.
5. Advanced cleaning procedure: With a punch, remove the extractor pin. The extractor can now be removed from the bolt. Place with the other small parts in a magnetic dish or on a paper towel (Figures 73 and 74).



*Figure 70: Remove the cotter pin from the bolt housing.*



*Figure 71: Remove the cotter pin from the bolt housing.*



*Figure 72: Remove the cam by tipping it out.*



*Figure 73: Use a punch to remove extractor pin.*



*Figure 74: Remove extractor pin. Be careful not to lose it.*

**Step 7 – Soak the individual parts** of the bolt housing in a dish of solvent and let stand. We'll use the Carbon Destroyer for this procedure.

**Step 8 –** With the bolt housing parts removed, apply a generous amount of solvent to the bolt housing, paying particular attention to the firing pin recess area. Let soak for 10 minutes, and dry with an air hose. Further dry this area with cotton swabs and a dry rag (Figure 75).

**Step 9 – Clean the bolt.** The bolt face should be cleaned with copper solvent, as build-up from the primer can be leftover from firing (Figure 76).



*Figure 75: Apply solvent to the bolt housing.*



*Figure 76: Clean off the bolt face with copper solvent.*



### Step 10 – Clean the bore.

Dip a patch with MSS Carbon Destroyer and place it onto a jag or cleaning loop. Place this down the barrel (Figure 77).

1. Attach a brush to the end of the steel cable, and run through the bore one to two times.
2. Dip the patch with MSS Copper/Lead Destroyer and run through the bore multiple times until no residue is left.
3. Run dry patches through the bore until it is free from solvent and residue.
4. Lastly, drop a small amount of MSS Spartan Accuracy Oil on a patch and run through the bore.



*Figure 77: Clean the barrel with a patch soaked in solvent.*

**Step 11 – Clean the chamber.** This is best cleaned with the given chamber brush in the Otis kit along with the copper rod attachment. Apply a G.I. brush with Carbon Destroyer and punch the chamber three to four times (Figure 78). Completely dry the chamber with cotton swabs or with a chamber cleaning tool from Brownells.

**Step 12 – Remove the handguards** or rails and scrub the barrel with solvent. Focus on the delta ring, as carbon build-up can form easily in that area.



*Figure 78: Clean the chamber using a brush.*





*Figure 79: Reassemble the weapon.*

**Step 13 – Clean the lower receiver.**

1. Apply solvent to the internal trigger mechanism. Unlike other platforms, we don't have to worry about stripping grease from the weapon. Dry with an air hose and/or with cotton swabs.
2. Remove the buffer and buffer spring. Spray with solvent, dry, and lightly oil the buffer.

Reassemble the weapon as described in the reverse order above (Figure 79).

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# Cleaning a Muzzleloading (Black Powder) Rifle

It is no surprise that even in today's market of high-dollar, military-style weapons there are still those who prefer shooting muzzleloaders for hunting and sporting use. In states where hunting seasons use a lottery process, using a black powder rifle can increase the chances for a draw. Muzzleloaders are also popular on the East coast of the U.S., due to its historical nature and up-close woods hunting.

Regarding the cleaning of these weapons, muzzleloading weapons differ from their smokeless powder counterparts as they do not build up copper or lead fouling. However, every black powder owner knows that it is highly imperative to remove all powder residue from the rifle directly after firing. For older black powder guns, the residue creates a thin salt compound that can degrade the functionality of the weapon, whereas with modern black powder substitutes such as Pyrodex, the corrosion is due to acidic compounds. In the Civil War, soldiers used to simply clean this residue from their weapons with boiling water and then dried them with a clean rag. These days, boiling water and soap still make a good cleaning option for muzzleloaders, but there are other options that we'll discuss here.

**Step 1– Make the weapon safe by visually inspecting the bore.** The unfortunate truth of muzzleloading is that black powder wads may be stuck down the barrel. This could be resulted from a weak primer ignition or if water and/or oil are heavily present in the bore.

**Step 2– Clean the bore.**

1. Since you've been given a product called Carbon Destroyer, this will help ensure that the bore is free from powder residue leftover during your shooting session.
  - Using the rifle's own ramrod, attach a patch dipped in Carbon Destroyer and punch the barrel three to four times. Continue using a solvent-dipped patch until it is mostly free of residue.
  - Using a dry patch, punch the bore again three to four times. Repeat this process with dry patches until the bore is completely dry. The remaining powder build-up should be removed at this point.
  - **Note:** Both during and after shooting, many muzzleloaders tend to "condition" their barrel with oil, much like a person would condition a cast iron skillet. We will apply a lightly oiled patch of Spartan Accuracy Oil to condition the barrel in between



*Figure 80: Muzzleloading rifle.*

shots while the barrel is heated. Traditionally, shooters would use homemade concoctions (a.k.a. “moose milk”), or a product called T/C Natural Lube 1000 Bore Butter® for this procedure as well.

**Step 3 – Clean the breech plug and/or flash pan area.**

2. For older caplock muzzleloaders, a primer is attached to a nipple, and the charge is then forced onto the pan where the powder has been poured. For vintage flintlocks, a piece of flint is clamped onto the hammer, and as the hammer drops, the flint strikes the frizzen (made of carbon steel) and sprays the pan with sparks to ignite the powder. We need to clean all of these areas, paying special attention to the pan hole that funnels the powder into the barrel. Take the Carbon Destroyer product and soak the nipple and flash pan area. Use a pipe cleaner to thoroughly clean inside the flash pan hole. Figure 81 will show another antiquated design: the wheel lock mechanism.
3. For modern inline muzzleloaders, the breech plug is where to find the small flash hole. Start by cocking the hammer, and unscrewing the plug from the breech. Soak the plug with Carbon Destroyer and let stand for 2 minutes. Clean thoroughly with a dry rag and use a pipe cleaner to clean the flash hole (Figure 82).



*Figure 81: Wheel lock mechanism.*



*Figure 82: Breech plug.*

**Step 4 – Clean the hammer and trigger group thoroughly with Carbon Destroyer.**

**Step 5 – Wipe down the metal parts of the rifle with a lightly solvent-dipped rag and dry with a clean rag.**

**Step 6 –** Since most muzzleloading rifles are only used once every season, it’s important to coat the rifle for storage. Once the bore is lined with oil or Bore Butter, we can focus on the other parts of the rifle. If using wooden grips, coat with furniture polish and a clean rag.



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## Cleaning Black Powder Weapons

Black powder firearms should be cleaned as soon as possible after firing. Both black powder and its substitute, Pyrodex®, are highly corrosive and will cause the bore of the gun to rust if not cleaned properly.

Our ancestors relied upon warm water and homemade lye soap for cleaning their muzzle-loaders, and this combination is still hard to beat. Soak a patch in warm water and some detergent. Since homemade lye soap is rare today, any commercial detergent will do. Then, run the patch the full length of the bore. Replace this first patch with another saturated with the water/detergent mixture and repeat the former operation. Again change patches and repeat until the wet patches come out clean. Then dry the bore thoroughly using clean, dry patches.

After the bore is completely dry, soak a clean patch with a good gun oil and run this in the bore several times. Wipe around the lock and hammer with a wet patch, then dry and oil all metal parts. Check the gun in several days and run another oiled patch through the bore. The gun should be further checked every week or two thereafter.

Cap and ball revolvers should be disassembled and the cylinder flushed with detergent water or a detergent and water-based solvent such as Hodgdon's Spit Bath. Clean the bore as described above.

When you run across a black powder bore that is extremely dirty, try the "pumping" cleaning method. Fill a two-gallon pail with warm water and about ¼ cup of dishwashing detergent. Cock the hammer and attach a piece of small-diameter rubber or flexible plastic tubing to the nipple. The tubing must be long enough to reach from the nipple, with the gun standing

upright, to the bottom of the pail. It should also fit the nipple tightly so it will not easily be forced off from pumping pressure. Holding the gun in this position, attach a tight patch to your cleaning rod, insert the patch into the muzzle, and slowly push it all the way to the breech. Pull the patch back toward the muzzle, but not all the way out. This suction action will draw the detergent water into the bore through the nipple. Pushing the rod toward the breech end will discharge the water back into the pail. Keep this back-and-forth pumping motion going for about 5-10 minutes. Change the water if necessary. Then clean, dry, and oil the bore as described previously.

### BLACK POWDER CLEANING AIDS

The Hodgdon® Powder Co. offers black powder accessories that will make cleaning black powder arms easier.



*Figure 83: Hodgdon Powder Co. makes cleaning products that make cleaning black powder arms easier.*



*Figure 84: Special care is needed to clean antique firearms, like this LeMat Revolver from 1861.*

**Spit Patch.** This is a nonfouling lube for rifles. It improves accuracy and gives more shots between cleanings. This lube makes cleaning simple, because it deposits lube in the bore while firing. Spit Patch dissolves fouling and helps the bore resist corrosion.

**Spit Ball.** This is a nonfouling lube for pistol shooters. Because lube is deposited in the bore while firing, it will also minimize chain firing in pistols and allow more shots between cleaning.

**Spit Bath.** A cleaner for both rifles and pistols, Spit Bath removes fouling and replaces moisture with light gun oil. It's good for cleaning between shots with black powder arms and excellent for final cleanup after a shooting session. Furthermore, it kills all black powder odors.

## CARING FOR ANTIQUE FIREARMS

All firearms collectors and museums have one problem in common: how best to clean and preserve their prized possessions. Not only do cleaning and preserving enhance the aesthetic appearance of a firearm, but they also protect the monetary investment that a gun represents. When properly carried out, they frequently increase

a firearm's economic value. We are not talking about restoring a badly abused firearm to new condition. Rather, we want to preserve as much of the original existing finish as possible and prevent — or at least retard — further deterioration.

In all aspects of cleaning and treatment of any antique firearm, there is a single watchword: caution. Go slowly. Except for the treatment of a gunstock infested with powderpost beetles, there is seldom any need to hurry. Therefore, study the situation well before you take any action. Make sure that you understand the problems fully and that you know the effect that you wish to produce; then proceed slowly. Hasty over-cleaning with harsh abrasives, strong chemicals, or improper solvents can ruin a gun just as completely as the unchecked ravages of time.

Before beginning to seriously clean any antique firearm, you should disassemble the gun as far as necessary to separate the metal parts from the wood, that is if this is possible without damaging any of the existing parts. Once separated, dirt and remnants of previous preservatives should be removed from the metal parts. Use a warm water/detergent mixture for removing dirt; oils and grease may be removed with such solvents as kerosene or acetone.

## SOLVING THE RUST PROBLEM

Unless protected, all metal parts will rust. Once the process of rusting has begun, all active rust must be removed, or the process will continue under any preservative coating that is applied. The old theory that a coat of oil or lacquer on a rusty gun barrel will prevent furthering deterioration is completely false. There is enough oxygen and moisture within the rust to continue the process.

If the gun parts were blued or browned and there is any chance of retaining a large portion of the original finish, cleaning will be a slow and delicate process.

Most bluing and browning processes involve artificially induced oxidation. Therefore, most chemicals that will remove rust will also remove the gun finish.

Blued or browned metal parts should be soaked thoroughly in kerosene to soften the rust, and then the individual areas should be treated with a rust remover as discussed previously in this lesson. For heavily scaled areas of rust, first use a single-edged razor blade, a dull knife, a strip of brass, or fine steel wool to chip off the larger pieces. All of these methods are acceptable, and it is surprising how much of the original finish can be retained if you are careful. The principal danger lies in accidentally scratching the good surface near the rust spots.

After the metal portions of the gun are finally cleaned, you must choose the proper preservative. There are several types to choose from, including greases, oils, lacquers, and waxes. The decision depends to great extent on how the gun is going to be used and under what conditions it will be stored.

**Oils and Greases as Protective Coatings.** Oils and greases are the old standbys. When applied to warm metal, they quickly penetrate the pores and provide a good preservative coating. On moving parts they also provide lubrication. Generally, the bore of a gun and the mechanism should always be coated with an oil or grease.

To be a good preservative, oil should be stable. It should cling to the surface to which it is applied and not tend to run. Some oils and greases contain paraffin in a relatively volatile solvent, which eventually evaporates, leaving a waxy coating behind.

Oils and greases also have their disadvantages. If a gun is to be handled, much of the coating comes off on the hands. This not only leaves the handler with dirty hands, but also gradually removes the protective coating from the gun.

**Lacquer as a Protective Coating.** Another protective coating is lacquer. This is somewhat more difficult to apply than either oil or wax, but it does provide a good invisible covering. Clear vinyl lacquers are best. Lacquer has few, if any, advantages over wax as an external preservative for metal. Its chief asset lies in its ability to prevent the corrosion of other metals.

It is extremely important to understand the difference between lacquer and varnish when these agents are considered for preservative purposes. Lacquer will adhere tightly to metal. Varnish will not. Lacquer is waterproof. Varnish is hygroscopic and readily admits moisture. Lacquer will remain clean and completely transparent. Varnish will turn yellow and hide the advances of rust underneath its coating.

**Wax as a Protective Coating.** Wax (Figure 85) has long been a favorite preservative for external surfaces on antique firearms. It will not come



*Figure 85: Rifle, Gun & Knife Wax can help protect your gun.*

off on hands, clothing, or backgrounds, and it withstands considerable wear. At the same time, wax provides an attractive finish that is slightly dust repellent.

If a gun is to be waxed, it is necessary to select the wax carefully. Choose a good grade of vegetable wax and avoid synthetic acid waxes. Simonize® is an excellent choice for most purposes. Its only drawback is that on a heavily pitted or engraved surface it remains an opaque white in the bottom of the indentations. Other waxes, such as transparent shoe polish, do not have this drawback. However, care should be taken to select a good shoe polish that contains neither water nor tannic acid. Transparent polish is one safe choice.

With all waxes, it is necessary to build up a good, hard covering. Apply the wax and let it

stand at least 30 minutes before polishing, and put on at least two coats.

With all of these protective methods, grease, lacquer, and wax, one thing is imperative: make sure the surface to be coated is clean and thoroughly dry.

**Wax as Preservation.** When you prepare an antique firearm for a preservation treatment, first remove the dirt by washing the piece in warm water and detergent, then remove any loose, scaly rust. Finally, smooth the surface with steel wool, taking care at all times to stop before reaching bare metal.

When cleaning has been completed, the object is ready for preservation. You can best preserve the gun by immersing it in melted wax. For preparation, first put the firearm, to which a piece of wire about a foot long has been attached, in an oven and “bake” it for a time sufficient to drive all the moisture out of the remaining rust. The time, naturally, will vary with the size of the object, ranging from a minimum of 1 hour to 8 or 10 hours. Set the oven on low heat when you first insert the object, then raise the temperature gradually until it approximates the temperature of the melted wax in which the object will be placed.

When you remove the gun from the oven, submerge it immediately in the melted wax and suspend it in the wax with the wire. The gun should remain submerged until all bubbling has ceased; then, withdraw the gun and hang it up by the wire so that the excess wax will drain off. The resulting finish will be a pleasing, uniform dark tone, and the piece will be strengthened and preserved from further rusting.

These are the basic methods that the average gunsmith will find useful for cleaning and preserving antique guns.



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# Firearm Storage

## COLD WEATHER PRECAUTIONS

Weapons exposed to extremely cold temperatures require special handling. An inferior oil or excessive lubrication could cause jamming. If in doubt, it is best to completely remove the old oil by flushing with bore cleaner. Dry all parts thoroughly and apply a very light coating of gun oil — a type that is specially formulated to remain effective in subzero temperatures.

Ideally, guns should be warmed gradually and not carried directly into a heated room after being outdoors in cold weather. Since this is not always practical, be sure to check both the bore and action for condensed moisture.

## STORAGE

A tight-fitted wooden cabinet or security chest is the best storage medium for the average gun owner. A steel cabinet is also good and offers some protection against fire and theft. If a cabinet is not available, a gun rack is the next best way to store firearms. Get a rack that permits the guns to rest either vertically or horizontally, but be certain that it is a plain wooden rack. Those made of iron, deer feet, and other materials may look impressive but they tend to damage the bluing. If you have to use an open rack, do not forget to dust the guns regularly, and keep them well oiled in humid weather.

You should not keep guns in clothes closets, in damp areas, or under the bed, even if the guns are cased. Canvas, leather, sheepskin, fiberglass, and wooden gun cases are good for transporting firearms, but if used for storing firearms, it is necessary to inspect the guns frequently to be sure that rusting has not started. Wool-lined

cases are especially susceptible to moisture. Some cases have been treated with a rust inhibitor, but that is no guarantee that in humid weather the bluing will not suffer, inviting rust. If guns are stored for long periods, clean them from top to bottom before shooting.

Use moisture-absorbing silica gel when guns are stored in high-humidity areas. Silica gel packs are one of the most effective moisture absorbers ever developed. These synthetic crystals prevent rust, mildew, corrosion, and tarnish before they start, by literally “sucking up” and safely holding the moisture that causes these kinds of damage. Yet, the crystals stay dry to the touch and will not harm or dampen any surface even when saturated. Most have a built-in indicator that changes from blue to pink when the crystals have absorbed all the moisture they can hold. However, they are easily activated by heating the packs in a conventional oven for 3 hours. The crystals can be reactivated over and over again, giving a lifetime of protection from the destructive effect of dampness.



*Figure 86: Get a gun rack that permits the guns to rest either vertically or horizontally.*

## LONG-TERM STORAGE

Guns that are to be stored for long periods of time need special attention. They should first be disassembled as far as practical and then thoroughly cleaned as discussed previously. All metal parts should then be greased, especially the bore. Rig® Universal™ Gun Grease is still the most popular solution for this purpose. This easy-to-apply, clean, viscous grease has been around for a long time and will provide absolute rust prevention to any firearm. It's also unaffected by long storage periods.

For added protection, Brownells GUNWRAP™ Paper is recommended. This tough, tear-resistant paper is saturated with VCI (vapor corrosion inhibitor) solution and is designed to be wrapped around metal gun parts for protection from moisture and rust. Actual tests show 10-15 years protection when steel parts were wrapped with this oiled paper, sealed in plastic, and stored in a cool place. If possible, gunstocks should be removed from the metal parts for long-term storage to prevent the wood soaking up oil, which eventually will stain or darken the wood.



*Figure 85: Rig Universal Gun Grease is easy-to-apply and will provide absolute rust prevention to any firearm.*

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